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ABSTRACT

Evolution of communication technology has enabled the educational community to interact synchronously or asynchronously with almost equal ease. Many instructors feel that synchronous interaction is the epitome of learning, while others feel that asynchronous interaction offers better learning opportunities. This paper uses the Delphi Technique in an attempt to arrive at an indication of whether instructors favor one interaction mode above the other. Eight experienced distance education instructors were interviewed for their opinions on the interaction types that are considered essential in online learning environments. The results show a predominant preference for the asynchronous mode for all types of interaction and a strong preference for teacher-learner interaction in the synchronous mode. The nature of interaction and the following eight categories of interaction ranked by the experts are discussed in detail: synchronous learner-material interaction; synchronous learner-self (reflective) interaction; synchronous learner-learner(s) interaction; synchronous teacher-learner interaction; asynchronous leaner-material interaction; asynchronous learner-self (reflective) interaction; asynchronous learner-learner(s) interaction; and asynchronous teacher-learner interaction. Three tables contain: experts' responses as to types of interaction essential in online learning; types of interaction ranked according to importance in online learning; and types of interaction according to revised rankings of importance in online learning. (Author/DLS)

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Interaction: What does it mean in online distance education?

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Abstract: Evolution of communication technology has now enabled us to interact synchronously or asynchronously with almost equal ease. Many instructors feel that synchronous interaction is the epitome of learning while others feel that asynchronous interaction offers better learning opportunities. This paper uses the Delphi Technique in an attempt to arrive at an indication of whether instructors favor one interaction mode above the other. Eight experienced Distance Education instructors were interviewed for their opinions on the interaction types that are considered essential in online learning environments. The results show a predominant preference for the asynchronous mode for all types of interaction and a strong preference for teacher-learner interaction in the synchronous mode.

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1. Introduction

Distance education is defined as education that "takes place when a teacher and student(s) are separated by physical distance, and technology is used to bridge the gap (Willis, 1993, p. 4). The separation of instructor and learner is sometimes viewed as a problematic issue in learning because it poses a barrier to interaction. Bates (1995, p. 13) asserts that high quality interaction with learning materials, between teachers and learners, as well as among learners, is essential for effective learning.

Within the constructivist framework and the learner-centered theory of learning, there is the notion of students creating their own meaning when they learn. If meaning is to be constructed, then the learner is central to the learning process in that personal experiences constitute what the learner comes to realize as "real" or viable. Interaction is crucial to student learning as the learner's experiences come from the interactions he has with the learning environment. The social negotiation of meaning is emphasized where interactive collaboration is seen as central to the learner testing the viability of his understandings in interactions with others (Duffy & Bednar, 1992). However, while everyone is in agreement as to the significance of interaction to student learning, the concept itself may have different interpretations for the online learning community.

2. The nature of interaction

Moore and Kearsley (1996) noted that the nature and extent of the interaction that would be deemed appropriate for any learning environment vary according to the teaching philosophy, the nature of the subject matter, the maturity of students, and the media used in the course. Given the large number of variables included, it is not surprising that it is difficult to agree on what is interaction. Moore and Kearsley

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got around the problem by categorizing interaction into three types: learner-content interaction, learner-instructor interaction and learner-learner interaction.

Learner-content interaction is the interaction the student has with the subject matter that is presented for study. Interaction between learners and content refers to learners constructing knowledge through a process of accommodating new understanding into their cognitive structures.

Learner-instructor interaction refers to the assistance, counsel, organization, stimulation and support that the instructor provides to the learner in helping the latter construct new understanding of the content. When the learner "applies" his new understanding through his interaction with the instructor, the instructor serves as a representation of the expert knowledge with which the learner can test the viability of his new understanding. Moore and Kearsley see this type of interaction occurring even when there is no face-to-face contact between the instructor and the learner, for example, in correspondence courses. When the correspondence instructor sits with a set of student papers, he enters into a silent dialogue with each individual learner-writer.

Learner-learner interaction refers to the interaction between one learner and other learners, whether alone or in group settings, with or without the real-time presence of an instructor. This is particularly important during application and evaluation of new knowledge as the learner's peers serve as a touchstone for his understanding.

Learner-self interaction refers to the learner's reflections on the content, learning process and his new understanding. Many educators would agree that an important goal of instruction is to develop skills of self-regulation in an effort to make the learner an independent and self-directed learner. This can be done by supporting the learner in reflecting on his learning and his learning strategies. In addition, we see reflection as conversing with oneself - a sort of "inner dialogue", where the learner takes on both the protagonist and the antagonist roles sequentially in an attempt to reframe his understanding. As such, learner-self interaction is very much a type of interaction and because of its importance to learning, it is included in this study.

3. Method

The study aims to clarify what types of interaction are considered essential for online distance education. To do this, this study attempted to capture the informed judgments of experts in the field of distance education.

Using the Delphi Technique, a total of three questions was sent, one at a time, to eight experts in distance education. These respondents were anonymous to each other. Their responses to each question were analyzed and used to generate the next question. With each question, more data were elicited to form a comprehensive picture of the issue. The Delphi Technique has the added advantage of being an established tool for generating a reliable ranking of options, in this case of the types of interaction deemed essential to online distance education.

4. Results and Discussion

The responses to the questions generated are presented in the tables below. These results are also discussed with regard to their implications for instruction in and design of online learning environments.

Table 1: Experts' responses as to types of interaction essential in online learning

Question 1: What type(s) of interaction is(are) necessary for learning in online distance education?

AM We feel that extensive interaction is needed. On the Internet, we have unique opportunities to incorporate all types of interaction. Our institution creates a virtual classroom that allows all participants to interact in real-time discussion. However, the most important thing about online interaction is that the technology used to enable such interaction is ***easy to use***. Some good tools

are listserv, and bulletin boards.

CB Good quality learning requires discussion, debate, team exploration, role-playing, competition, and project work. This level of interaction can only be gotten from peers. Since the teacher cannot respond to all requests for assistance, students have to depend on their peers. Such a range of interaction would require private chat tools, email, fax, and asynchronous conferencing. Basing a portion of final grades on peer responsiveness and dialogue depth will enhance interaction.

CS For students to interact with each other, using a listserv is sufficient. However, such interaction must be mandatory or it would not happen.

DM The types of interaction necessary range from interacting among themselves as needed in student-based learning to just receiving information as in teacher dominated learning. At a minimum, a chat room is necessary and ideally, a video link at each site.

EC Students need to interact with each other. Chat lines, email, and moderated newsgroups will enable the needed interaction.

JH Both synchronous and asynchronous interactions are necessary. Asynchronous interactions are needed to set up conferences and sub-conferences to organize interactions between participants and for sharing and manipulation of educational material. Synchronous interaction is needed for private and public discussion. A chat room serves this purpose.

JS Real-time interaction in medium-sized groups is most important. That is the chief advantage of classroom instruction. Video-conferencing captures this edge better than email, computer conferencing, or any type of one-to-one communication.

The responses in Table 1 show that a range of interaction types is deemed necessary although learner-learner interaction seems to be more prominent. An interesting finding is the prominence of tools in the minds of the respondents. Interaction seems to be inexorably linked to technology tools and their uses. This is indeed one of the distinguishing features of distance education. Technology appears to be the factor that both enables and constrains the learning we want to instill in these online environments. As educators, we should, indeed must, begin our inquiry from the kind of learning and by extension, the types of interaction that we want. However, the second step is to refer to the technologies that exist to see if they support the interaction and learning we want. It is possible that not all the types of interaction we want can be supported by the technologies available in our instructional environments. Instructors are then faced with the choice of whether to accept running a program with limited interaction capabilities or eschewing distance education until the technology supports the range of interaction we want. It is not the purpose of this paper to explore the match of technology and interaction. However, it would be useful to rank the types of interaction mentioned in this study according to their perceived importance to enable educators in this dilemma to make a more informed decision.

To enable ranking of the types of interactions, we first grouped them into the six categories listed below:

Synchronous Learner-material interaction - refers to student learning from instructional events such as live broadcast or doing a scientific experiment. The learners are not interacting with other people even though the event he is watching may be happening in real-time.

Synchronous Learner-self (reflective) interaction - refers to reflection. Editing stuff one has just written is one example. Only one party is involved here - interacting with one's own thoughts. Sometimes this takes the form of a debate with oneself, taking on both the roles of protagonist and antagonist.

Synchronous learner-learner(s) interaction - refers to interaction between learners that occurs in real-time such as in face-to-face communication, IRC, or computer video-conferencing. This is particularly valued for group collaboration.

Synchronous teacher-learner interaction - refers to interaction between instructor and learners. Teacher-centered instruction over the web will be one extreme of this category, while two-way question-and-answer sessions will be the other extreme. In most instances, interaction between learners is not included.

Asynchronous Learner-material interaction - refers to students learning from instructional materials such as web-pages and books. Again, the learners do not interact with other people although materials may be animated.

Asynchronous Learner-self (reflective) interaction - Reflecting on one's work may not occur instantly. Some people will deliberately put aside stuff they have written and go back to it some weeks or months later, with a fresh perspective developed in the intervening period.
Asynchronous learner-learners interaction - refers to students interacting with each other but not in real-time. Email and newsgroups are the most common examples.
Asynchronous teacher-learner interaction - refers to interaction that is broken by a time lag. There is no immediate conversation-style interaction. An example would be when the teacher emails the student or puts out an announcement on the listserv.

Having established our categories, we posed the second question.

Question 2: How would you rank the following types of interaction?
(A ranking of 10 denotes "most important" while a ranking of 3 denotes "least important". Each ranking can be given only once, for example, there cannot be more than one category ranked 10 by the same respondent.)

Table 2: Types of interaction ranked according to importance in online learning

Ranking	Type of interaction
8.750	Asynchronous learner-learners interaction
8.500	Asynchronous teacher-learner interaction
7.875	Asynchronous learner-material interaction
6.125	Synchronous teacher-learner interaction
5.625	Asynchronous learner-self (reflective) interaction
5.250	Synchronous learner-learners interaction
5.000	Synchronous learner-self (reflective) interaction
4.875	Synchronous learner-material interaction

Asynchronous learner-learner interaction was rated the most important type of interaction for online distance education, as seen in Table 3. The three top-ranked categories are asynchronous interactions and the three lowest ranked categories were synchronous interaction. This indicates that real-time interaction is not highly valued by distance educators. Two other features stand out. Both types of teacher-learner interactions are in the top half of the table, ranking second and fourth respectively out of eight. This indicates the respondents think the teacher has a fairly important role in online learning environments. However, as noted before, the respondents obviously believe in learner-centered learning since they rated learner-learners interaction as most important. Both types of learner-self interaction are in the bottom half of the table, ranking fifth and seventh respectively out of eight. Reflection has relatively low priority in the scheme of things in this learning environment.

The findings above reflect an artificial averaging of disparate ratings by individuals. It is not a true consensus. While we think it is unlikely to achieve a true consensus in this matter, we feel that it is beneficial to narrow the divergence between the individual respondents and elicit information about why they ranked the categories in the ways they did. To achieve this aim, we posed the third question.

Question 3: Considering the averaged rankings (in Table 1), **indicate why you would, or would not, agree with the ranking given for each category of interaction** (You may revise your original rankings if you wish).

This question gives the respondents an opportunity to reflect on and justify their original positions. To facilitate this, Table 1 was made available to them and they were asked to revise, if necessary, their original rankings. However, only three of the eight respondents responded to this question. Table 3 shows the revised rankings of the categories based on the ranking of these three respondents.

Table 3: Types of interaction according to revised rankings of importance in online learning

Original Ranking	Revised Ranking	Type of interaction
8.750	9.333	Asynchronous learner-learners interaction
8.500	8.333	Asynchronous teacher-learner interaction
7.875	7.333	Asynchronous learner-material interaction
6.125	7.333	Synchronous teacher-learner interaction
5.625	6.000	Asynchronous learner-self (reflective) interaction
5.250	5.667	Synchronous learner-learners interaction
5.000	4.000	Synchronous learner-self (reflective) interaction
4.875	4.000	Synchronous learner-material interaction

The revised rankings do not differ from the original rankings. Due to the relatively few responses, some categories were ranked as equally important. Asynchronous learner-material interaction is rated 7.333, as is Synchronous teacher-learner interaction. Synchronous learner-self interaction is rated 4.000, the same as synchronous learner-material interaction. The experts' reasons for their ranking in Table 3 are discussed below.

Asynchronous learner-learners interaction

From their ranking, it is evident that the experts regard learners as the most important aspect of learning. Thus the learner is central to any learning that may take place. Distance learners are generally mature learners with commitment to careers and families and busy schedules. Hence, asynchronous interaction is often regarded by instructors as the most productive and appropriate form of communication in online courses.

Asynchronous teacher-learner interaction

While learners are central to the learning process, guidance from teachers is still necessary. This partnership in learning explains why this interaction is ranked second. In fact, the experts are mindful of *not* using the teacher-centered approach and they see the asynchronous mode as the best way to ensure that teachers become less domineering and improve thoughtfulness in their responses to the learners.

Asynchronous learner-material interaction

Students eventually will need some content material to dwell on. The asynchronous mode allows them to read and react in a manner that is independent of time and place in this mode of interaction.

Given these perceived advantages, asynchronous interaction is deemed to be more prominent to the synchronous mode for *learning*. This is especially so since learners can make use of asynchronous interaction more conveniently, for instance, at home or in the workplace.

Synchronous teacher-learner interaction

Synchronous teacher-learner interaction is deemed slightly more important than asynchronous reflections. This is because reflection is deemed to have occurred as part of the first three categories and therefore need not be emphasized. On the other hand, real-time contact with a teacher might keep the learner motivated and involved.

Asynchronous learner-self (reflective) interaction

Reflection is critical to learning. In fact, this is ultimately where learning occurs as learners retreat from interaction to focus on individual and internal reflections. In fact, some experts consider this to be slightly more important than real-time teacher-learner interaction. However, most instructors regard this as occurring naturally as part of other interaction and therefore did not rank it highly.

Synchronous learner-learners interaction

Surprisingly, synchronous interactions are not highly valued, even interaction between learners. An expert felt it may be needed for some learning activities such as reflection on expert panels but is not really a necessity.

Synchronous learner-self (reflective) interaction

Revising one's thinking is regarded as one type of interaction wherein good learning occurs. The learner plays around with ideas and contemplates on his actions and thinking. However, as with learner-self reflection, the experts see this as occurring naturally and therefore did not see the need to rate it highly also.

Synchronous learner-material interaction

The experts see this type of interaction as more important in certain subject areas like physics and chemistry, and to a lesser extent in subjects like music, art, sports and so forth.

Overall, this is a composite image, that is, an average ranking of often sharply differing views. One expert refused to accept the overall ranking because he believes that real-time interaction is the key to effective learning. His institution has been committed to using the synchronous interaction mode since 1982. He believes that the other experts in the group rated the synchronous mode low because they do not have a way to do it easily and well. However, he also feels that the asynchronous mode is also important and a blend of the two is needed for effective online learning.

5. Conclusion

The reasons put forth by the experts show that the rankings were not given randomly. They had put much thought into the exercise, and much of that is supported by their experience in distance education instruction.. It is unlikely that a consensus can be reached but it would appear that the majority supports the use of the asynchronous mode. Advocates of this mode feel that the use of this mode is more convenient for distance learners and meets learners' interaction needs. On the other hand, the synchronous mode has an unassailable immediacy and this condenses communication in a way that cannot be duplicated fully online. The classroom is the foremost example of the synchronous mode and its continued prevalence even with a generally inferior cost structure shows that it is still the favored way to learn. That it has been often misused by a dominance of teacher-centered instruction does not detract from its inherent flexibility and compactness.

When it comes to the different types of interactions, there is a clear preference for learner-learner interaction followed by teacher-learner interaction. The surprise is the low ranking for reflection but this does not mean it is regarded as unimportant. Clearly, distance educators regard reflection as part and parcel of the other highly ranked interaction types. However, this situation should not be taken for granted and educators need to focus on learning strategies that would foster critical reflection to improve higher level thinking among learners.

Perhaps the question of what types of interaction and mode are needed in distance education should be answered by the learners themselves. While experts have a good perspective on these issues because of their close involvement with the field, it is the learner who knows best what works for him or her. Also we need to bear in mind that what is best for a learner can be the sum of many factors - accessibility and costs among them. It does the learner no good if we know what the best mode and types of interaction are for the learner but the learner cannot afford them.

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